**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**SUPERFUND & EMERGENCY MANAGEMENT DIVISION**
**REGION 4**

**61 FORSYTH STREET**
**ATLANTA, GEORGIA 30303-8960**

September 23, 2021

**MEMORANDUM**

**SUBJECT:** Risk review comments for the Pre-Final (95%) Remedial Design Basis of Design Report, LCP Chemicals Superfund Site, Operable Unit 1, Brunswick, Georgia

**FROM:** Sharon R. Thoms, Life Scientist
Scientific Support Section
Resource & Scientific Integrity Branch

SHARON THOMS
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Date: 2021.09.23 15:36:15 -04'00'

**THRU:** Tim Frederick, Chief
Scientific Support Section
Resource & Scientific Integrity Branch

Tim Frederick
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Date: 2021.09.24 09:47:38 -04'00'

**TO:** Pamela Langston Scully, Remedial Project Manager
Restoration and Construction Section
Superfund Restoration and Sustainability Branch

Per your request on August 24, I have reviewed the Pre-Final (95%) Remedial Design (RD) Basis of Design Report, LCP Chemicals Superfund Site, Operable Unit 1 (OU1), Brunswick, Georgia. My review concentrated on the long-term monitoring plan. The 95% Pre-Final RD report was dated August 2021.

**GENERAL COMMENTS:**

1. The 2015 OU1 Record of Decision (ROD) included the following components of the remedy:

   - Dredging approximately seven acres (~22,000 cubic yards [CY]) in the LCP Ditch and Eastern Creek to a target depth of 18 inches;
   - Backfilling the dredged areas with ~14,000 CY of clean material;
   - Replanting the disturbed vegetated marsh areas with native plants;
   - Capping approximately six acres in Domain 3 Creek and Purvis Creek;
   - Thin-layer placement on approximately 11 acres of marsh;
   - Confirmation of co-location of dioxins/furans with Aroclor 1268;
   - Dewatering dredged sediments on-site and disposing of them at licensed off-site facilities;

- Constructing staging areas and temporary access roads;
- Restoring of disturbed areas;
- Monitoring in the short-term during the construction phase, including soundings and surveys to verify removal depths, depth verification measurements to document material placed, and/or material coverage assessments;
- Monitoring in the long-term the remedy's long-term effectiveness in enhancing ecosystem recovery and reducing risks to human health and the environment; and
- Institutional controls (ICs).

The scope of the work contained in the RD was modified on account of the pre-design data to replace the approximately six acres of capping in Domain 3 Creek and Purvis Creek with dredging in Purvis Creek and Domain 3 Creek, which increased the extent of dredging from approximately seven acres to eight acres (Figure 1-2). Appendix C explains the increase in the total of acres to be excavated based on refinements in the pre-design study. The other remedy components remained the same. Please enhance the explanation in Section 1.1.5 by referring to Appendix C. Some explanation is needed to explain how six acres of Purvis Creek to be capped (now dredged) was added to the seven acres originally targeted for dredging for a total of eight acres. Appendix C explains this, but discussion is needed for the main text. Please assess whether the redrawn boundaries of the creeks capture all locations with COC concentrations above the benthic CULs within the cutlines for dredging.

2. The ROD directed on Page 77, "Sufficient sampling in Domains 1, 2 and 3 will be undertaken during the Remedial Design phase to confirm that the PCDDs and PCDFs are co-located located with the Aroclor 1268." Please update the RD to briefly state the co-location study was completed and what it concluded.

3. Appendix A, Long-term Monitoring Framework, of the ROD indicated that, "Based upon the ROD RAOs, the LTMP will develop specific goals and data quality objectives (DQOs) which will define the data needed and upon which the plan for collection of data (e.g., the sampling design) will be based. However, DQOs were not presented in the RD to inform the design of the sampling plan. The number of fish tissue samples did not consider variability to achieve statistical power to verify that a result was less than a performance goal. In addition, the LTMP did not develop performance measures or triggers related to each RAO as EPA directed in the ROD Appendix A. Step 6 to identify performance measures and triggers is part of the DQO process that was not followed as conveyed in the ROD. Please see Figure 2 in USEPA (2006) for the steps in the DQO process. Develop DQOs for every RAO and data collection effort.

4. No monitoring or performance measures specific to RAO 1 were included in the LTMP. Appendix A, Long-term Monitoring Framework, of the ROD indicated that sediment monitoring was anticipated to be used in assessing attainment of cleanup levels, contaminant redistribution in the marsh, contaminant flux, incorporation of thin-layer cover (TLC) material into the marsh surface, as well as other data needs for RAO #1 in the ROD which is to "Prevent or minimize chemicals of concern (COCs) in contaminated in-stream sediment from entering Purvis Creek." Suspended sediments entering Purvis Creek from the site during the portion of the tidal cycle

where water flows into Purvis Creek can be sampled for the concentrations of COCs in the suspended sediments compared to the CULs. The information can be used to assess whether the site is a continuing source of contamination to Purvis Creek and whether dredged areas of Purvis Creek might become re-contaminated. No post-remedy monitoring of suspended sediments was planned for Purvis Creek to assess the potential for COCs to enter Purvis Creek on suspended sediments. The table in Section 2.2 on Page 9 of Appendix I referred to RAO 1 but did not pertain to minimizing contaminated sediment entering Purvis Creek. Please update the monitoring plan to include DQOs for RAO 1. Sediment traps are recommended.

5. The measure for achieving RAOs 2, 3, and 5 was reduction of the surface-area weighted average concentration (SWAC) to meet the SWAC cleanup levels (CULs) for mercury and Aroclor-1268. Section 8.1.1 of the ROD (Page 52) indicated that the SWAC CULs apply to the total creeks and the entire domain. Moreover, Page 54 stated that the following SWAC CULs will be applied to each exposure domain and the total creeks area to achieve the predicted post-remediation SWACs for the Selected Remedy:

   Mercury – 2 mg/kg

   Aroclor 1268 – 3 mg/kg.

   Table 4-7 in Appendix C of the RD provided predicted post-remedy SWACs for Domains and creeks. The pre-remedy SWACs from the ROD and the post remedy SWACs are estimated by calculations. They are presented without an expression of the error in the estimate or the uncertainty about the value. The changes to the SWACs in the 50% RD in response to redefinition of the creek boundaries highlight the uncertainty in the SWAC estimates, some of which are projected to be only slightly below the SWAC CULs post remedy. The SWAC estimates in Table 4-7 are averages and are not the 95% UCLs used for comparison to the SWAC CULs. A 95% UCL can be developed from Thiessen polygons, but this is not a straightforward task and requires bootstrap methods. This comment is recommending ISM approach to sample for conservative estimates of the average concentrations of the COCs to compare with SWAC CULs in the decision units in Table 4-7 post-remedy (ITRC 2020).

   The LTMP lacks post-remedy unbiased sampling of creek sediments to measure the average concentrations of mercury and Aroclor-1268 in the exposure domains and the total creek area to compare with the SWAC CULs. The thin-layer cover was intended to accelerate natural recovery processes that gradually reduce the SWAC in Domains 1 & 2. This comment recommends incremental sediment sampling to overcome the variability in the concentrations in the creeks and Domains 1 & 2 of the marsh. Incremental sampling can measure the average concentrations systematically to address whether the RAOs have been met. Since fish tissues and surface water are indirectly affected by the sediment remediation, the primary measure of remedy success is reduction in the SWACs to meet CULs. The purpose of the LTMP was to verify that the site met CULs. The fish tissue concentrations were not CULs but performance goals. The SWACs should be empirically measured instead of estimated or predicted from Thiessen polygons and interpolations. Note that the LCP Ditch and

positions of the Eastern Creek were previously dredged and somehow became re-contaminated, that is, the concentrations in the previously dredged sediment were not equal to the detection limit, as is assumed in the model predicting SWAC reductions.

6. The ROD indicated in Section 8.4 (Page 56) that "tissue monitoring for mercury and Aroclor 1268 in common prey (mummichog, fiddler crab and blue crab) will be included in the monitoring program (See Appendix A)." Blue crabs, however, are not included in the LTMP. The ROD further states that "If the resulting calculated hazard quotients for the receptors are less than one, then the goal of reducing exposures to these receptors (i.e., RAOs 2 and 5) would be achieved." Based on the ROD definition of successful achievement of RAOs 2 and 5, tissue concentrations of blue crabs, fiddler crabs, and mummichogs are needed to support food-chain models for piscivorous birds and mammals. No specific performance goals were included in the ROD for prey items. The 95% upper confidence levels on the mean concentrations detected in the prey items were intended to be entered into a food-chain model to estimate a hazard quotient. A hazard quotient less than 1 was the ROD performance goal. LOAEL risks to piscivorous birds and mammals will be reduced to an HI of 1 or less, according to ROD Page 79. The green heron was indicated to be the most sensitive ecological receptor on Page 76 of the ROD. Areas of OU1 with HQs over 1 included Eastern Creek, LCP Ditch, and Domains 1 & 3 (ROD Table 23). The diet of the green heron was assumed to be 90% mummichogs, 5% fiddler crabs, and 5% blue crabs. The diet of the raccoon was 45% blue crabs. Update the RD to include monitoring of mummichogs, fiddler crabs, and blue crabs in Eastern Creek, LCP Ditch, and Purvis Creek. RAO 2 specified that concentrations in prey items of piscivorous bird and mammal populations would be reduced to acceptable levels versus simply being reduced. Please revise text to refine the goal for prey tissue to reduce to acceptable levels as indicated by LOAEL HQs less than 1. A statistical approach is needed to determine the sampling sizes for ecological risk reduction in HQs and comparison to baseline conditions. Since 95% UCLs will be used in the FCM, at least 11 samples are needed. The FCM also include incidental sediment ingestion, which could employ the SWAC. Some receptors like the raccoon have a diet high in blue crabs, so blue crab data is needed for the performance evaluation to cover important prey species for ecological receptors of concern. Blue crabs are recommended to be collected from two stations in Purvis Creek, seven composites at each station.

7. RAO 5 was "Reduce, to acceptable levels, finfish exposures to COCs from ingestion of prey and contaminated sediment in the LCP Chemicals marsh." The LTMP should be revised to include whole body fish tissue sample or the analysis of the carcass in addition to the filet to reconstruct the whole-body fish concentration to assess the exposures to finfish to assess whether exposures to finfish are declining. The finfish species proposed to monitor were southern kingfish (whiting) and spotted seatrout. The fishes historically monitored for the ecological risk assessment were the black drum, red drum, silver perch, spotted seatrout, and striped mullet. Please enhance the discussion of rationale for selecting the two species by including size, lipid contents, feeding habits and movement patterns Please include measurement of whole-body concentrations as these are more relevant to exposures to the fish themselves.

8. It is recommended to collect at least five composites of the two finfish species from each sampling location per guidance in USEPA (2008). A site-specific statistical evaluation of the number of samples to achieve at least 80% power to detect a 20% decrease should be sought. A statistical evaluation should be performed to guide the number of fish tissue composites.

9. Alternative 6, the selected alternative in the ROD, combined sediment removal, sediment capping and thin-layer placement to accelerate natural recovery. The phrase "accelerate natural recovery" indicated an expectation that natural recovery was part of the remedy and hence monitoring should include measuring the average concentrations of sediment over the domains and creeks in Appendix C Table 4-7 to assess the progress in meeting RAOs 2, 3, & 5. Average concentrations in a decision unit are typically measured by incremental sampling to handle variability and to produce the most reliable estimate. This comment is providing additional rationale for the recommendation in General Comment 2 for incremental sampling of sediment concentrations in Domains 1 & 2 and the creeks. The ROD included an expectation that concentrations of COCs would experience a decline throughout the decision units, including in areas of the domain or creek outside of the remedy footprint to result in a reduction in the overall average concentration if not by constructing the remedy by waiting for concentrations to naturally reduce over time. Therefore, the LTMP should include a contingency for monitoring beyond the first five years, such as in ten years, if average concentrations have not achieved the SWAC CULs in the total creek area or Domains 1 & 2.

10. The SWAC reductions estimated in Table 4-7 assumed the area receiving the TLC attained a post-remedy concentration equal to the detection limit. However, the final concentration in the biologically active zone of the TLC is unknown. In addition, the areas of Domains 1 & 2 outside the areas receiving the TLC might experience declining concentrations by natural processes. Decision units representing the areas inside the TLC and outside the TLC within each of Domains 1 and Domain 2 are recommended for ISM for the 0- to 6-inch depth interval. Composite samples of the top 6 inches are recommended for the 60 locations to estimate the upper confidence limit on the average concentration of mercury and Aroclor-1268 in the TLC. Discrete samples are recommended for the 6- to 12-inch interval to compare with the benthic invertebrate CULs, which are not-to-exceed values to ensure that the cover is at least 6 inches over any concentrations that exceed benthic CULs. The area outside the TLC should also be sampled by ISM in the top 6 inches to develop an upper confidence limit on the average concentrations of mercury and Aroclor-1268. This information should be used to reconstruct the SWAC for the combined remediated and un-remediated domain to verify that the SWAC CULs have been met. It may be advantageous to perform the monitoring as soon as possible so that the extent of the TLC can be extended if needed as well as after four or five years to verify that sediments depositing on top the cover or mixing into the cover have not elevated the confidence limit on the average concentrations in the TLC area to a degree that the SWACs for Domains 1 & 2 exceed the SWAC CULs.

11. The LTMP currently lacks sediment sampling of the areas of Purvis Creek, LCP Ditch, Eastern Creek, and Domain 3 Creek that are planned for excavation and

placement of backfill. The SWAC reductions assumed the backfilled areas would have negligible contamination. These comments recommend sampling of the biologically active depth of the backfill to estimate a 95% UCL of the average concentration of mercury and Aroclor-1268 for the excavated areas. The creek areas that were not excavated can be sampled for mercury and Aroclor-1268 to provide a 95% UCL on the average concentrations for input to a new calculation of the SWACs post -remedy for comparison to the SWAC CULs. The ISM can sample the creeks over a grid to capture the banks as well as the centerline to provide a robust characterization of the conservative estimates of the average concentrations. None of the SWAC estimates in Table 4-7 of Appendix C are conservative estimates of the mean (i.e., 95% UCLs) for comparison to SWAC CULs.

12. Long-term monitoring of mercury and Aroclor 1268 concentrations in the total creek area should include in the sampling design monitoring of the western creek complex and isolated portions of the Domain 3 complex because Section 13.1 (Page 75) of the ROD indicated "Although the Selected Remedy will leave elevated concentrations of mercury and Aroclor 1268 in isolated portions of Domain 3 Creek and in the WCC that exceed benthic CULs, the SWAC CULs are met. Long-term monitoring in these two creeks should confirm that residual contamination does not pose an adverse risk to fish, wildlife, and humans." The ROD anticipated that the LTMP would include sampling of the western creek complex and the Domain 3 complex, including the isolated portions that are not planned for excavation. The boundaries of the decision unit for the total creek SWAC include the WCC and the portions of Purvis Creek, Eastern Creek, and the Domain 3 Creeks that were not excavated as well as areas that were excavated. An unbiased estimate of the total creek area average sediment concentration in the biologically relevant depth interval is needed to answer the question of whether the remedy has achieved the SWAC CULs, thereby addressing RAOs 2, 3, & 5.

13. The LTMP included sixty samples over the 12.2-acre thin-layer cover of sediments from the 0-6-inch and 6-12-inch intervals for COCs. The purpose of sampling the cover was not explained in the LTMP. A purpose of the thin-layer cover was to dilute the concentrations to accelerate natural recovery to reach the SWAC goal. Performance standards and triggers for the TLC area were not defined. The sampling of the TLC should compare the concentrations detected in the 6- to12-inch interval with the CULs for the benthos. The TLC sampling will collect discrete samples for comparison to not-to-exceed sediment CULs. The thickness of the cover should be at least 6 inches over sediments that exceed the CULs for benthos. Measurements of the depth of the sand cover over sediment with concentrations above the benthic CULs can be used to ensure exposures are reduced. If the sand cover is not thick enough, additional material can be added. Expand discussion of how the depth of the sand cover will be measured at the locations of the cover sampled at the two depths. Photographs of cores are recommended. Finely sectioned cores through the TLC are recommended to examine the mixing by burrowing organisms and deposition of materials potentially containing COCs on top of the cover. The finely sectioned cores can be used to decide whether sampling of the TLC should take place beyond the first five years. See Appendix A of the ROD for explanation of what the EPA was looking for in the LTMP.

14. The ROD indicated the focus of the LTMP is to verify:

- Risk reduction to acceptable levels;
- Meet RAOs and clean-up levels; and
- The physical integrity of remedy construction elements, specifically the caps; and the assumptions used in remedy selection, such as the sediment concentrations in thin-layer areas affected by burrowing organisms.

Risk reduction to acceptable levels refers to RAO 2 and requires tissue monitoring of prey items that make up the food-chain model to the green heron (most sensitive ecological receptor). The RD discussed a decision criterion of whether fish tissue concentrations were trending downward. Several measurements over time are needed to detect a downward trend. Please enhance the discussion of the number of sampling events needed to detect a trend. More than three events (zero, three years, and five years) will likely be needed to detect a downward trend in finfish tissue concentrations. Moreover, the term "trending" was not in the ROD. The decision rules should copy language from the ROD such as "to levels that are protective."

15. ROD Section 13.2.3, Long-Term Monitoring Program, Page 78, indicated the LTMP would include:

- Sediment monitoring;
- Water column monitoring;
- Fish and shellfish monitoring;
- Cap and thin-layer cover monitoring; and
- Benthic community assessment and re-vegetation of disturbed areas.

Appendix A of the ROD clarifies the role of sediment monitoring within the LTMP:

*Within the LTMP sediment sampling and analysis is anticipated to be a component of multiple evaluations of the overall remedy performance. Sediment monitoring is anticipated to be used in assessing attainment of cleanup levels, contaminant redistribution in the marsh, contaminant flux, incorporation of TLC material into the marsh surface, as well as other data needs. The specific sediment monitoring parameters will be established during design and in the LTMP and linked to ROD RAOs as will all monitoring efforts. For example: sediment monitoring is needed to meet RAO #1 in the ROD which is to "Prevent or minimize chemicals of concern (COCs) in contaminated in-stream sediment from entering Purvis Creek."*

The ROD anticipated sediment sampling to be used to assess the attainment of CULs. The main CULs are SWAC CULs for mercury and Aroclor-1268. The RD should incorporate sediment sampling to verify attainment of SWAC CULs as reinforced by comments recommending ISM.

16. RD Section 13 is entitled "Long-term Monitoring" however, monitoring is only proposed for five years, which is not long-term in CERCLA perspective. EPA guidance on using fish tissue data to monitor remedy effectiveness defines long-term

remedy performance as monitoring to answer the question, "Have the sediment cleanup levels been reached and maintained for at least five years, and thereafter as appropriate?" I recommend to sample in years 1 and 4 to have the data ready for the first five-year review, allowing time to analyze and evaluate the data. By the first five-year review the goal is to have the data necessary to evaluate short-term protectiveness of the remedy or short-term risk reduction. Even if the concentrations were trending downward in fish tissue, the remedy would probably only be short-term protective. Monitoring beyond the first five-year review would be necessary to document long-term protectiveness. Monitoring for long-term protectiveness is likely to continue beyond the first five-year review to measure whether remediation goals in fish tissue have been reached and the benthic community has recovered.

17. The remedial action objective pertaining to the benthic community was:

*RAO 4: Reduce risks to benthic organisms exposed to COC-contaminated sediment to levels that will result in self-sustaining benthic communities with diversity and structure comparable to that in appropriate reference areas.*

The LTMP proposed a benthic community assessment to document the composition and reestablishment of the benthic community following placement of the thin layer cover. These comments recommend that the RD discuss the biological mixing zone in relationship to the proposed sampling of the TLC in the 0- to 6-inch interval and the 6- to 12-inch interval. Revise the RD to include measurements taken to assess reduction in risks to the benthic invertebrate community by comparing the concentrations to the CULs for benthic organisms. The benthic community sampling is currently planned to be conducted in year one and year five at five locations within the cover area. The progress in year five is to be compared to year one. Given RAO 4's specification of comparing to a reference location, benthic community results should compare to one or more suitable reference locations. The goal is to ensure the benthic community has recovered from placement of the TLC and that the TLC is effective in reducing exposures to the benthic community. Appendix A of the ROD clarified the purpose of the benthic community monitoring as:

*Establishing baseline benthic community conditions both before and after remediation is important. Benthic community assessments may be targeted at locations in TLC areas to assess impacts of the cover on reestablishment of the benthic community. In addition, benthic assessments may be targeted in selected un-remediated portions of the marsh and compared to an appropriate reference envelope so that monitoring results (various biological integrity metrics appropriate to the habitat) are evaluated within a range of background marsh conditions. This is because community assessments have many confounding factors such as particle size distribution, detrital and organic carbon contents, sediment stratification, and variable tidal positions within the marsh.*

Characterization of the benthic community prior to remediation is important to have something to compare with the data collected after one and five years to assess the reestablishment of the benthic community. The ROD stated that benthic monitoring will require baseline surveys in the affected areas and in the reference envelope prior to remedial action. There ROD anticipated in RAO 4 that the remedy would do more

than allow the benthic community to recolonize but that the community that recolonized would be similar to a reference location, i.e., not impacted by contamination from the site. Please revise the RD to include baseline sampling of the benthic community and sampling of suitable reference locations not impacted by the site.

18. The benthic community assessment is proposed for five locations within the TLC area. As the composition of the benthic community is affected by many factors such as elevation and tidal position the sampling design should be stratified to account for the important variables with five locations for each group. As the variability is great in terms of the densities of fiddler crabs present, a sampling plan is needed to obtain sufficient samples to characterize both the site and reference areas. Enhance the discussion of the characteristics of the benthic macroinvertebrate community. Discuss literature on the rates of recolonization. Include some replication of benthic community samples in the design. Consider mud flats and small creeks separately.

19. Water quality monitoring will be conducted to measure contaminant concentrations in surface water over time to assess whether concentrations are meeting or trending toward State of Georgia water quality criteria. Surface water samples will be collected at six locations within Purvis Creek, LCP Ditch, and Eastern Creek and one reference location in Troup Creek. The surface water samples will be submitted for total mercury, PCBs, and lead on a filtered and unfiltered basis and total suspended solids. Surface water sampling will be conducted in the fall during two tidal events: one at approximately ebb tide conditions and one during flood tide conditions. Because of RAO 1 the surface water entering and exiting Purvis Creek at the LCP Ditch should receive special attention. Surface water samples should be collected from fish sampling areas to assess the reductions in exposures to fish from reduced contamination in surface water, which means that surface water should be monitored at the locations proposed for finfish collection in Zones D, and H/I. Zone H/I contains Purvis Creek, which is planned for surface water sampling, but Zone D, Turtle River, should add surface water sampling.

20. Because one of the fish tissue goals is for methylmercury in tissue, consider analyzing surface water samples for methylmercury as well as total mercury to better understand the bioavailable fraction. Surface water samples should be analyzed for dissolved organic carbon and total organic carbon to assess bioavailability.

21. The aquatic life criteria represent continuous exposure or annual average concentrations. To best represent long-term concentrations an understanding is needed of the variability in the surface water concentrations seasonally or over the tidal cycle. Some measurements of surface water concentrations over a range of conditions may be necessary for the first monitoring year to select the most representative time to sample. For Aroclor-1268 surface water samples could be collected over two months or more with passive samplers to integrate the sample over a longer exposure time and to reach the lower detection limits for human health criteria. Reductions in Aroclor-1268 concentrations detected by a passive sampler would provide a near-term estimate of reduction in exposure to fish and would have less variability than trying to estimate exposure reduction by sampling fish tissue alone. The average concentration of Aroclor-1268 over a longer period is more

relevant to exposures to fish. Grab samples can be subject to variability with the tidal cycle as mentioned in the RD, a passive sampler could provide better representativeness of average conditions and eliminate some of the factors related to temporal variability. There is not an adopted method of using a passive sampler for mercury. This comment is recommending surface water sampling to characterize temporal variability or the use of passive samplers for Aroclor-1268 in surface water.

**SPECIFIC COMMENTS:**

1. *Appendix C, OU1 Remedy Updates, Table 4-7, Original Boundary Area vs. Updated Boundary Area Surface Weighted Average Concentration Values.* Table 4-7 indicated a SWAC adjustment from 3.0 mg/kg for Aroclor-1268 and 2.1 mg/kg for mercury to a post-remediation updated boundary SWAC of 2.6 mg/kg for Aroclor-1268 and 1.5 mg/kg for mercury. The difference was -0.4 mg/kg for Arochlor-1268 and -0.6 mg/kg for mercury. Please add an explanation to Appendix C of how the SWAC estimates for the Western Creek Complex changed when no remediation is planned in the Western Creek Complex or in the surrounding marsh in Domain 2. There appears to have been some reassignment of samples from the Western Creek Complex to the Domain 2 marsh, however, Appendix C did not include this information.

2. *Appendix I, Table 3, Summary of Long Term Monitoring, Page 7.* Table 3 in appendix I indicated that at least two reference locations would be used in the vegetation survey. Section 13, Page 64, however indicated that ten reference locations would be used in the survey. Please revise for consistency. Revise Appendix I to discuss the criteria used to select appropriate reference locations for the vegetation survey.

3. *Appendix I, Table 3, Summary of Long Term Monitoring, Page 7.* Table 3 indicated 24 samples of fiddler crabs, while Section 13, Page 65, and Table 5 of Appendix I indicated 21 samples of fiddler crabs. Please revise for consistency. Five fiddler crab composites and five mummichog composites are recommended instead of three to detect a minimum difference of 35 percent at 80% power from the left-most figure of Figure A-1 of USEPA (2008).

4. *Appendix I, Section 2.0, Thin Layer Cover/Disturbed Area Monitoring, Page 9.* The objectives for the TLC monitoring should include verification of the depth of the cover. Performance standards in the tables in Section 2.2 and Section 4.2 need to be more specific than "improving." Use language from the ROD for RAOs, such as "result in self-sustaining benthic communities with diversity and structure comparable to that in appropriate reference areas."

5. Appendix I, Section 5, RAO Attainment and Adaptive Management, Page 18. Text indicated that "Mummichog and fiddler crab tissue data will be compared to historical data. . ." However, Appendix I, Section 4.2, Page 14, indicated that mummichog and fiddler crab data will be assessed for concentrations declining compared to baseline data. Please revise Section 5 to reflect the table in Section 4.2.

6. *Appendix I, Section 5, RAO Attainment and Adaptive Management, Page 18.* Please revise to complete sentence, "If other elements of the remedy attain their respective CULs and standards but (for example) tissue concentrations do not, or if downward trends in tissue concentrations of mercury and Aroclor 1268 are delayed longer than anticipated."

7. *Appendix I, Figure 4, Surface Water Sampling Locations.* Figure 4 shows six sampling locations for surface water to target areas where remediation took place. Surface water of Domain 3 Creek is not included in the surface water monitoring program although it was part of the dredge and backfill. Please explain why Domain 3 Creek was not included.

**REFERENCES:**

ITRC 2020. Incremental Sampling Methodology (ISM) Update. Prepared by the Interstate Technology & Regulatory Council (ITRC), October 2020. Available at: https://ism-2.itrcweb.org/wp-content/uploads/2020/11/itrc_ism_compiled_508_011921.pdf

USEPA 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process – EPA QA/G-4. Published by the U.S. Environmental Protection Agency, Office of Environmental Information, Washington, D.C. EPA/240/B-06/001. February 2006.

USEPA 2008. Sediment Assessment and Monitoring Sheet (SAMS) #1: Using Fish Tissue Data to Monitor Remedy Effectiveness. Published by the U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation and Office of Research and Development. June 2008. OSWER Directive 9200.1-77D. Available at: https://semspub.epa.gov/work/HQ/174470.pdf.

If you should have any questions, please feel free to contact me at (404) 562-8666.